

To solve $\frac{2}{3}x = 8$, multiply each side of the equation by the reciprocal of $\frac{2}{3}$, or $\frac{3}{2}$.

EXAMPLE Using Reciprocals to Solve Equations

- 2 Solve $\frac{2}{3}x = 8$. Check the solution.

$$\frac{2}{3}x = 8$$

$$\frac{3}{2} \cdot \left(\frac{2}{3}x\right) = \frac{3}{2} \cdot (8) \quad \leftarrow \text{Multiply each side by } \frac{3}{2}, \text{ the reciprocal of } \frac{2}{3}.$$

$$1 \cdot x = 12 \quad \leftarrow \text{Multiply.}$$

$$x = 12 \quad \leftarrow \text{Simplify.}$$

Check $\frac{2}{3}x = 8 \quad \leftarrow \text{Start with the original equation.}$

$$\frac{2}{3} \cdot (12) \stackrel{?}{=} 8 \quad \leftarrow \text{Substitute 12 for } x \text{ in the original equation.}$$

$$8 = 8 \quad \checkmark \quad \leftarrow \text{The solution checks.}$$

GO for Help

For help multiplying fractions, go to Lesson 6-1, Example 1.

Quick Check

2. Solve $\frac{7}{8}x = 42$. Check the solution.

EXAMPLE Writing and Solving Equations

- 3 A volunteer group has 6 yards of material to make flags for Community Day. Each flag uses $\frac{5}{8}$ yard of material. How many flags can the group make?

Words yards per flag \times number of flags = total yards



Let b = number of flags

Equation $\frac{5}{8} \times b = 6$

$$\frac{5}{8}b = 6 \quad \leftarrow \text{Write the equation.}$$

$$\frac{8}{5} \cdot \left(\frac{5}{8}b\right) = \frac{8}{5} \cdot \frac{6}{1} \quad \leftarrow \begin{array}{l} \text{Multiply each side by } \frac{8}{5}, \text{ the reciprocal of } \frac{5}{8}. \\ \text{Write 6 as } \frac{6}{1}. \end{array}$$

$$1 \cdot b = \frac{48}{5} \quad \leftarrow \text{Multiply.}$$

$$b = 9\frac{3}{5} \quad \leftarrow \text{Simplify.}$$

The group can make 9 flags.

Quick Check

3. How many flags can the group make with 13 yards of material?

GO for Help

For help writing an equation, go to Lesson 3-7, Example 3.

Check Your Understanding

1. **Writing in Math** Without solving the problem, how can you tell that the solution to $\frac{b}{4} = 2.5$ is greater than 8?

Name the reciprocal you use to solve each equation.

2. $\frac{m}{3} = 9$

3. $\frac{2}{5}x = 5$

4. $\frac{5}{9}z = 30$

Solve each equation. If possible, use mental math.

5. $\frac{v}{4} = 11$

6. $\frac{s}{5} = 35$

7. $\frac{4}{5}y = 8$

Homework Exercises

For more exercises, see Extra Skills and Word Problems.

GO for Help

For Exercises	See Examples
8–13	1
14–20	2–3

Solve each equation. Check the solution.

8. $\frac{x}{3} = 12$

9. $\frac{a}{7} = 8$

10. $\frac{j}{12} = 27$

11. $\frac{x}{15} = 3$

12. $\frac{t}{2} = 75$

13. $\frac{r}{12} = 1.5$

14. $\frac{1}{2}m = 6$

15. $\frac{2}{3}r = 10$

16. $\frac{3}{5}n = 9$

17. $\frac{7}{8}b = 14$

18. $\frac{3}{20}x = 5$

19. $\frac{3}{4}y = 21$

20. **Coin Collecting** The value of Gerald's coins is $\frac{7}{12}$ the value of his brother's coins. Gerald's coins are worth \$14. What is the value of his brother's coins? Write and solve an equation.

GPS

21. **Guided Problem Solving** The Sears Tower in Chicago is 1,450 feet tall. The height of the Sears Tower is $\frac{29}{25}$ of the height of the Empire State Building in New York City. About how tall is the Empire State Building?

- **Understand the Problem** What information do you have? What information do you want to find?
- **Check the Answer** Estimate the height of the Empire State Building.

22. **Costumes** A costume uses $\frac{5}{6}$ yard of ribbon. You have 9 costumes to make. How many yards of ribbon do you need?

